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THE MAGAZINE FOR ELECTRONIC COMMERCE STRATEGISTS

FROM THE EDITORS OF COMPUTERWORLD

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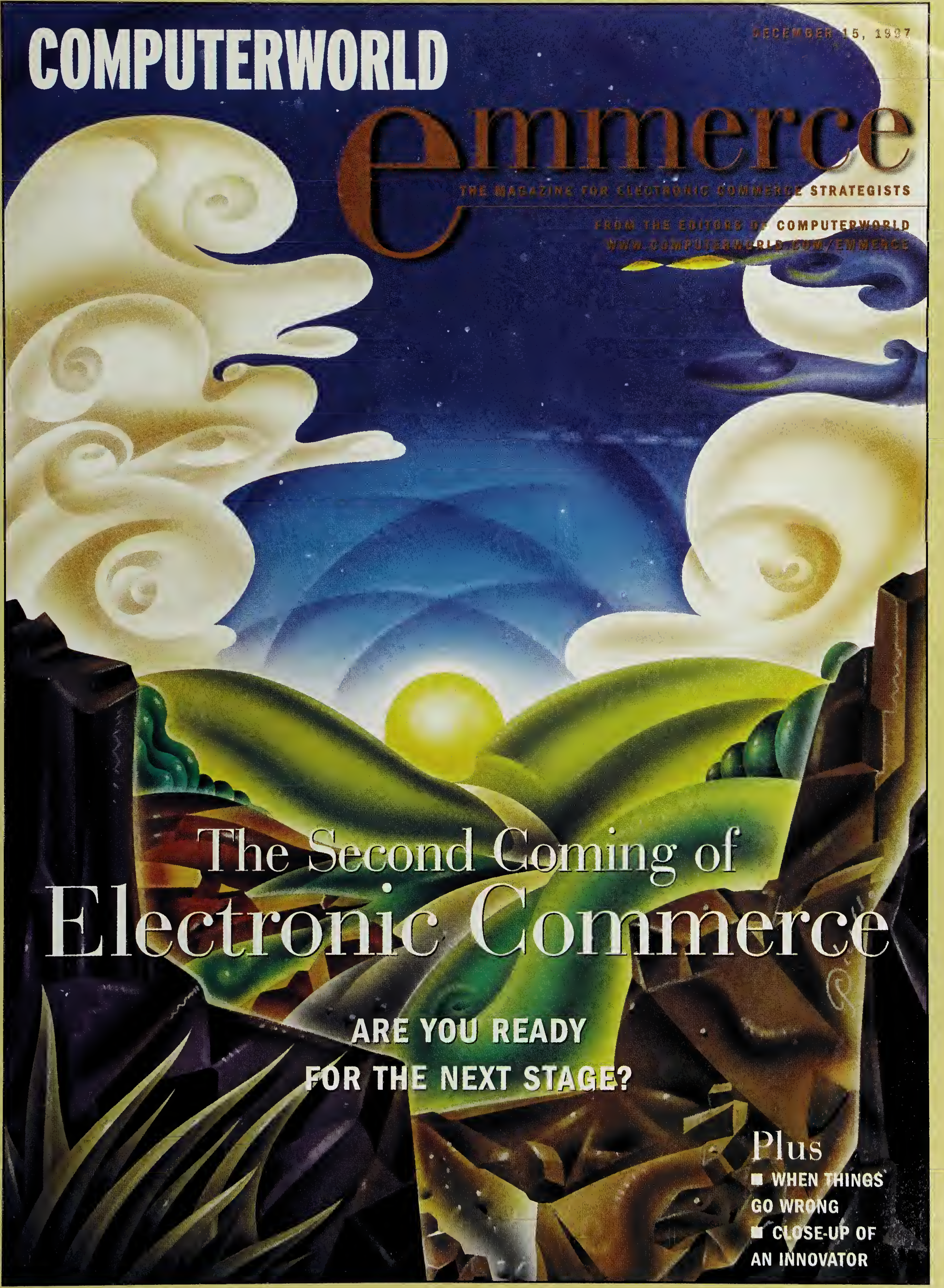

The Second Coming of Electronic Commerce

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EDITOR'S NOTE

Take Two

As we approach the end of 1997, it appears that electronic commerce systems have reached a new plateau. Who, for instance, isn't redesigning at least a portion of his Web site or strategy?

Looking around, you notice many companies either tossing out or adapting their first-phase Web sites. And, in some cases, there is a whole new way of thinking about these chapter two systems.

The first thing you might notice is their ambitious scope. Genstar Container in San Francisco, for instance, undertook a $1.5 million project that entailed building a mission-critical extranet that mimicked the full life cycle of the business (see story, page 10).

Of course, not every company will have the stomach to "go all the way." Part and parcel of second-generation systems is a rational approach that considers the resources at hand but designs with growth and change in mind.

Second, the leading implementers are beyond thinking in terms of stovepipe systems. As one user put it, "We're circling the wagons" and planning a corporatewide system that doesn't isolate departments such as purchasing, sales, marketing and logistics. In other words, fewer companies next year will be taking orders with a front-end Web system without integrating that with an order-taking application at the back end.

Bruce Guptill at Gartner Group goes so far as to say that companies without an enterprise commerce strategy together by the end of 1998 will be the least competitive companies in their markets through the next five years.

And here's a sure sign that companies are treating electronic commerce systems not as a sidelight but as a mainstream piece of business technology: Contingency plans are starting to crop up. Not only are companies building redundancy into their Web sites, but disaster recovery services are also being offered by traditional suppliers such as Comdisco and Sungard (see story, page 18).

In just a short period of time, electronic commerce is likely to become so bound in with the way a company does business that some pundits suggest the very term "electronic commerce" will become meaningless. Rather than being a subject for individual study, it will simply become "the way companies do business."

> Electronic commerce is likely to become so **BOUND** in with the way a **COMPANY** does business that the term may become **MEANINGLESS**.

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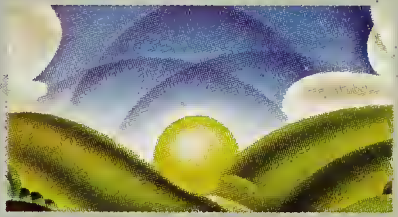

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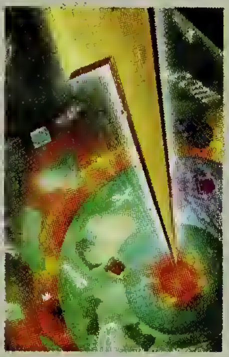

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THE Exchange

TRENDS, IDEAS AND ISSUES IN ELECTRONIC COMMERCE

COMMERCE BY NUMBERS

Electronic payments is the biggest revenue driver this year among five sectors of EC. But content will see the greatest CAGR.

Security
(Firewalls, encryption tool kits, payment security software, ID tokens, intrusion detection software)
'97* revenue: $868M
CAGR '96-2001: 39%

Electronic payments
(Payment processing, electronic bill payments, digital currency)
'97* revenue: $10B
CAGR '96-2001: 21%

Financial services software
(Internet banking, online trading and financial management software)
'97* revenue: $1.2B
CAGR '96-2001: 26.7%

Business commerce software
(Electronic catalog software, EDI software/services)
'97* revenue: $1.6B
CAGR '96-2001: 33%

Commerce content
(Books, CDs, wine, industrial supplies, plastic resin)
'97* revenue: 3.8B
CAGR '96-2001: 217%

Source: Piper Jaffray, Inc.
*Projected

Opt-in E-mail: Spam's Respectable Cousin

By John R. Howe

Think "E-mail marketing," and you probably think "spam." But a number of companies are using "opt-in" electronic mail to earn incremental revenue and keep customers coming back. Customers ask for it so they can hear about products and services they're interested in.

By most accounts, "opt-in" E-mail was pioneered by American Airlines' Net SAAver service, which E-mails subscribers weekly about discounted fares available on short notice. Since last May, Net SAAver has gone from 20,000 to more than 1 million subscribers and brings in about six figures a month from tickets the airline would not otherwise have sold. Spokesman Tim Smith said it's the combination of low operating cost and hefty incremental revenue that has made the program successful.

> OPT-IN E-mail's low **OPERATING** cost and fast **TURNAROUND** make it a **USEFUL** tool.

The mailings are produced with a proprietary program American created in-house last year when it couldn't find a commercial product able to process Net SAAver's heavy load. Addresses are stored in an Oracle Corp. Oracle7 database. The messages are created on a Silicon Graphics, Inc. Origin 200, and the job takes six hours a week to run.

Online industry analysts agree that while opt-in E-mail is a relatively small corner of the electronic commerce market, its low operating costs, compared with print direct mail, can make it a valuable marketing tool.

"If you can target messages effectively and have a strategy to use them, obviously the return on those [E-mail] programs are astronomical because your base is zero," said Scott Nelson, an analyst at Gartner Group, Inc. in Stamford, Conn.

Bill Bass, an analyst at Forrester Research, Inc., agreed, pointing to several airlines' use of opt-in E-mail as a natural fit. "Airlines have real problems with inventory control," he said. "The expiration date on their product is absolute and short term. On products like that, [opt-in E-mail] is great. And it's also a great deal for the consumer — it's win-win both ways."

For customer retention, Bass added, opt-in E-mail is "one of the greatest things since sliced bread. You can communicate with your customer base extraordinarily cheaply, and it's one-to-one marketing that the customer asked for, so it's nonintrusive."

REI'S MATT HYDE: TOTAL SALES FROM THE WEB SITE HAVE TOPPED SALES FROM SOME OF ITS SMALLER OUTLETS

PHOTOGRAPH BY DAVIS FREEMAN

REI, a Seattle-based outdoor equipment firm with about $500 million in sales last year, sends its Gearmail subscribers regular E-mails on products, upcoming sales and other events. REI online store manager Matt Hyde said sales from REI's Web site have topped sales from some of its smaller retail outlets.

Gearmail runs off a Microsoft Corp. Access database and an IBM RS/6000 server. REI plans to boost productivity by integrating the database with an enterprisewide, proprietary customer data system that will be networked with REI's stores, mail-order service and Web site, Hyde said.

Nelson confirmed that opt-in E-mail is most productive when it is fully connected to a company's back-end system. "The optimal [scenario] would be to have it tied to your inventory and manufacturing system such that you had triggers that said, 'When these events occur, we want to notify our customers.' "

WHOSE CALL IS IT?

The big question is who decides what should trigger a mailing: the business or the consumer. "With event-driven computing, either the person sending the information can set up the rules about the event or the end user can," said Maureen Fleming, a Gartner analyst. "In my mind it's always, 'Let the end user win' because then you have a more qualified lead."

All of which is easier said than done. Case in point: Travelocity, a Web site owned and operated by The Sabre Group, notifies FareWatcher subscribers whenever a fare they're interested in drops more than $25. But subscribers also receive targeted promotions they didn't ask for. Sabre Chief Information Officer Terry Jones maintained that those mailings are "relatively low intrusion" because FareWatcher subscribers volunteer their E-mail addresses when they sign up. "We can send literally hundreds of thousands of E-mails and get maybe 10 people who say, 'Please don't do that again,' " he said.

Forrester's Bass doesn't buy Jones's justification. "If I opt in and all of a sudden you start sending me a whole bunch of advertising things, that's spam," he said.

Gartner's Nelson agreed that low negative response is no guarantee a mailing has been successful. "Sending customers information they're not really interested in only makes them less sensitive to future offers," he said.

But Nelson is more sanguine than Bass about how far businesses can push the "opt-in" envelope, suggesting it can be stretched to include the use of information customers provide over time. "There's a lot of times you can use the information, but you have to soft-pedal that you know as much as you do about your customers or they start to become very nervous," he said.

Howe is principal writer at Clearwater Communications, a writing and editorial services firm in Cambridge, Mass.

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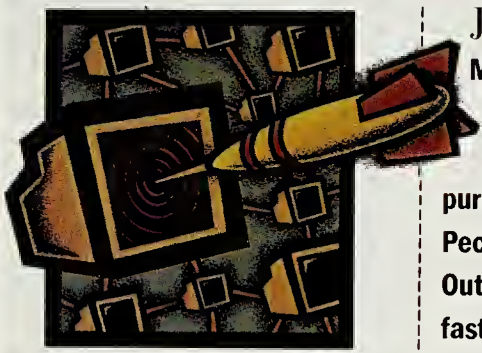


Hitting the Bull's-Eye

CHANCES ARE you've never heard of Pall Corp. It specializes in industrial filtration and separation systems. But recently, Pall had its own filtration problem: How could it sift through the floods of people in cyberspace and grab the attention of those most likely to need its products? In the end, Pall chose a filter that was so serious as to be comical – a rather dorky-looking fellow named Dilbert. You know, the cartoon character.

Working with an online marketing agency, Hensley Segal Rentschler, Inc., Pall bought banner ad slots on the pages of DilbertZone, the cartoon's Web home (www.unitedmedia.com/comics/dilbert). Dilbert "draws a very corporate audience," said Michael W. Hensley, eCommerce director. "A lot of people check into Dilbert from their offices to get a daily Dilbert fix."

Pall also arranged through the DoubleClick network, Dilbert's Web ad rep, to display its ads only to visitors in process-oriented industries – a simple matter of looking for traffic arriving from proxy servers located at, say, Kodak, Merck and Intel. The result: Pall's gaining some 25 new qualified sales leads per day.

– JOHN VERITY

Just Send the Box

MAYBE OTHER Web software sellers are high on downloading software to purchasers, but not Darryl Peck, president of Cyberian Outpost (www.outpost.com), a fast-growing, Web-based seller of computer hardware and software. In fact, unlike competitors Internet Shopping Network and MicroWarehouse, his site doesn't have electronic software distribution (ESD) capabilities.

Peck doesn't see ESD ever appealing to more than 10% to 15% of the consumer market – his target audience. Plus, he said, the basic ESD infrastructure is still in flux.

Meanwhile, Cyberian takes its international business very seriously. Its home page is available in 11 languages.

But Peck plans to go beyond mere language translation. During the next six to nine months, he hopes to create the ability to sense which country a buyer is from and send him to a localized version of the site.

Cyberian's sales are expected to reach $30 million this year. Peck said he expects to be profitable next September.

– MARY BRANDEL

ILLUSTRATIONS BY CHRIS BALDWIN

NO SMOKE, NO MIRRORS

Electronics distributor uses a single-database approach to its real-time order-processing system

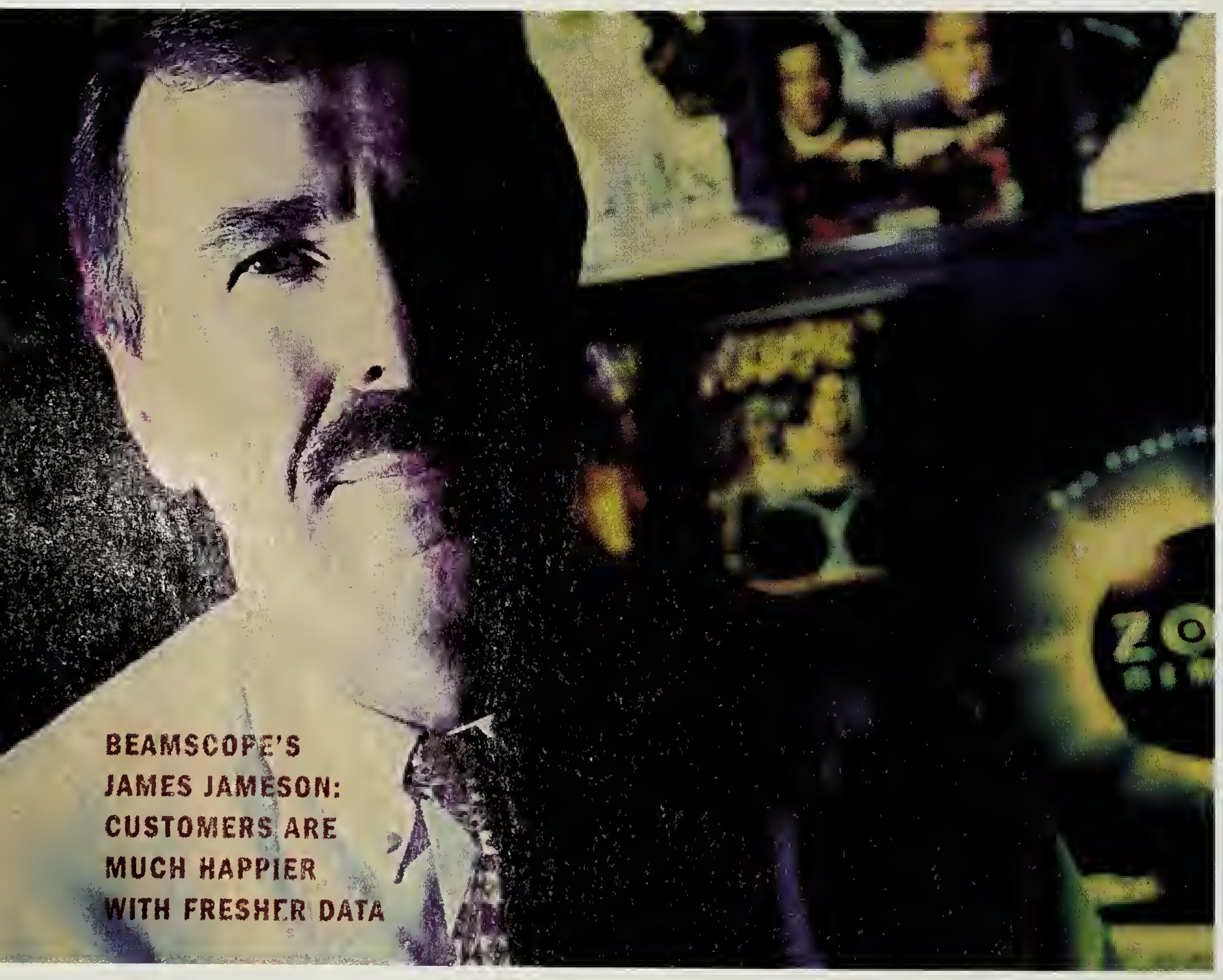
BY JOHN VERITY

Remember the guy who liked his Norelco electric shaver so much he bought the company? Well, Beamscope Canada, Inc., a distributor of consumer electronics gear, believed so strongly in the potential of its new electronic commerce setup that it put $1 million (Canadian) on the line to fund the company that developed it. It looks like the risk is paying off as Beamscope begins reaping the benefits of its Web-based order-processing system and redefines itself as a high-tech distributor.

Richmond Hill, Ontario-based Beamscope distributes stereos, computer gear, software and other items to mass retailers such as Wal-Mart Stores, Inc. and Sears, Roebuck and Co. and to almost 6,000 independent camera shops and small retailers.

But no matter what their size, all of these outlets began pushing Beamscope a few years ago for more accurate order-taking, faster deliveries and fewer products out of stock. The largest customers were submitting orders via traditional electronic data interchange (EDI) while the vast majority used the telephone and fax.

Meanwhile, Beamscope was preparing to take its stock public: "We wanted to separate ourselves from the competition," recalled James Jameson, chief operating officer. "We decided to become a high-tech distributor and solidify our position as the experts in distribution."



BEAMSCOPE'S JAMES JAMESON: CUSTOMERS ARE MUCH HAPPIER WITH FRESHER DATA

Like most distributors, Beamscope's gross profit margins were razor-thin — less than 10% — and its options were limited. "In distribution, I can't raise prices," Jameson said. "I only get to lower my cost per transaction. It's a matter of nickels and dimes."

So the company launched an overhaul of its logistics process, engaging a small team of outside software developers who developed a PC application that enabled retailers to connect over a Datapac line (a data-only service in Canada) into Beamscope's central IBM AS/400. This relatively simple terminal emulation setup enabled retailers to scan Beamscope's live inventory files and place orders electronically.

It worked fine, too, helping wean thousands of retailers from faxing and phoning. "Customers were much happier being able to work with fresher data," Jameson recalled. Indeed, after going public in 1994, Beamscope went on to triple its revenue, from $93 million to a projected $300 million-plus this year. Gross margins, meanwhile, have remained relatively flat and are now in the 9.6% range — several points ahead of competing distributors.

But as helpful as the new setup was, serious shortcomings remained, he said: Even with the 56K bit/sec. Datapac lines, it took many seconds for screens to display new data. Graphics were minimal. And each update of the client-side software meant producing and mailing boxloads of floppy disks — a major distribution problem.

But then the software team let Jameson and other Beamscope executives in on its plan to move the remote access setup to the Web. Persuaded of the Web's great poten-

PHOTOGRAPH BY ALAN MARSH/KLIX

tial, Beamscope turned venture capitalist and took a controlling stake in the software team's new company, Ironside Technologies, Inc., also in Richmond Hill.

This summer, Beamscope began taking orders over the Web using Ironside's Ironworks software. Now a retailer boots up a browser program and connects to Beamscope's Web server, which is an Intel Corp. Pentium-based PC running Windows NT. That machine immediately sends them a Java applet that, as Jameson put it, "explodes" its full-color graphics on the retailer's screen.

How the System Differs

The key to the system is the direct connection between the Web server and the AS/400 database. The Java-based server code uses standard remote procedure calls rather than terminal emulation to reach into the AS/400 programs. This helps maximize access speed and gives the server a broader menu of data and services. The direct connection also enables retailers to quickly access the freshest possible pricing, product and inventory data, as well as their own specific pricing and other contractual data.

In contrast to other electronic commerce setups, this also means there's no mirror, or duplicate, database to update periodically or refresh with data about new products, prices or clients. Nor does Beamscope have to duplicate or tinker with the business logic coded in its AS/400 applications.

This kind of ordering directly from a company's main computer is "growing in popularity," said Carl Lehmann, program director at Meta Group, Inc. in Westport, Conn. In the past year or so, Web technology has improved enough to make this kind of single-database setup practical.

Real-time access to inventory data is especially helpful in the hit-driven software market: In late September, as Canadian hockey fans eagerly awaited the release of a computer game called NHL '98, Beamscope updated its Web site every 15 minutes with news about the software.

In a more typical session, a retailer might look at Beamscope's inventory to see what's available, scan current promotional offers, browse pages describing manufacturers' latest products and place an order and receive immediate confirmation. As of this past fall, retailers can track their shipments at the Beamscope Web site, too, thanks to a live data feed from United Parcel Service, Inc.

The server handles up to 200 sessions at once. Response times are usually less than a second, Jameson said. And retailers can view color photos and video clips of most of the 6,500 products the distributor stocks.

Beamscope has not yet delved into electronic payments. But financial details on each retailer are stored in the AS/400. These programs track outstanding invoices and credit status so that when the customer places an order, the system does a local lookup. If he's about to exceed his credit limit, he's given notice. If all's OK, the system accepts the order and sends him an invoice via postal service or fax.

In terms of security, Beamscope depends on Secure Sockets Layer and selected encryption. The Ironside system allows a few encryption options: It can be applied to just IDs and passwords; to certain sensitive fields of data; or to the entire message sent back and forth across the Internet.

The system makes life easier for Andy Levi, president of Educational Technologies, Inc., which runs a Toronto-area chain of eight specialty-game stores called Mastermind. "I know my order is in [Beamscope's] computer," he said. "There's no rekeying of purchase orders or mistakes. With a fax, I wonder, 'Did they get it?' I wish other suppliers [used the Web], too."

Levi voiced one complaint: The Web pages do not display as many products as he can see on a single paper catalog page. At the same time, the limited breadth is balanced by increased depth of information.

Beamscope has just started taking orders over the Web, so bottom-line improvements are difficult to estimate. But Jameson estimated that costs fell from just over $5 to process a phone and fax order to about 50 cents online. The system cost about $250,000 to build, plus the $1 million investment in Ironside.

But the benefits go beyond cost savings. Nine regional sales agents can use the Web link while visiting retailers, using laptop computers to dial into the Internet. Jameson has hired a sales manager just to oversee that way of using the Web setup because "it's clearly a sales tool. It's just like having 15 telemarketing sales reps in-house."

So far, Beamscope has limited use of the new system to about 600 of its 6,000 small retailers. More will be invited to use it once the home office has finished shaking down a new high-capacity T1 link expected to be completed in October, Jameson said.

Next up will be Beamscope's large, EDI-oriented customers. Their information systems departments and upper managers, who've overseen major investments in EDI technology over the years, are mounting some resistance. But the advantages for a Wal-Mart or Kmart Corp., Jameson said, are hard to resist: increased flexibility and reduced paperwork. Sales agents could sign on to Beamscope's Web site in the morning, say, and throughout the day build a single large order piece by piece. At the end of the day, a supervisor could review the order as a whole. But all along, the proper number of items will have been reserved and will be on hand for next-day delivery.

But with EDI, each segment of that order would get processed separately, using its own purchase order and waiting for the same supervisory review, and there'd be no way to reserve inventory. "Once they see it," Jameson said, "the large retail chains are all pushing to use our Web site." And once they use the site, he hopes they'll be pushing to order more products, too.

Verity is a freelance writer in Brooklyn, N.Y.

BEAMSCOPE CANADA, INC.
$300 million electronics distributor
Richmond Hill, Ontario

- **THE CHALLENGE: Provide highly accurate order-taking, faster deliveries and fewer products out of stock.**
- **THE SOLUTION: Retailers access the Windows NT-based Beamscope Web server, which sends them a Java applet. From here, they can place an order, check pricing or look up inventory data. The Web server uses standardized RPCs to reach directly into the AS/400 database, where this data is stored.**
- **THE RESULTS: Costs fell from $5 to process a phone and fax order to about 50 cents online. Also created a whole new means of selling Beamscope goods.**
- **SYSTEM COST: About $250,000 to build, plus a $1 million investment in the software provider.**

The Second Coming of Electronic Commerce

WHILE MOST OF US ARE STILL IN THE WOODS, OTHERS ARE AT LEAST GLIMPSING A SECOND GENERATION OF ELECTRONIC COMMERCE

By Natalie Engler

Like most first cracks at electronic commerce, Egghead Computer, Inc.'s fell somewhat flat. "Frustrating" was the word at least one customer used to describe the World Wide Web-based ordering and software downloading service Egghead introduced a year ago. Even the Spokane, Wash.-based reseller's vice president of information systems, Tom Collins, acknowledged that, early on, the site offered little content, provided insufficient customer service and was "very difficult to get around."

So the company spent this summer remodeling the flat-file HTML site and added a database-driven back end that runs on Silicon Graphics, Inc. WebForce servers and pulls data from legacy Hewlett-Packard Co. and IBM AS/400 systems. Today, navigating the Web site is faster and easier, and customers know immediately whether a product is available.

The once-disappointed customer called the new site a "joy to visit." While Egghead declined to discuss the cost of the overhaul, Collins expects it to pay for itself in less than six months by generating new business.

Sound familiar? When Internet-based electronic commerce first appeared on the scene, it promised the world: a competitive edge, new ways of doing business and generous profits. So firms rushed to build systems. And in their haste, many shoveled information onto the Web, built online catalogs and malls that confounded customers and made pledges they didn't have the resources to keep. The effect, said Heather Stark, principal consultant at consulting firm Ovum, Inc., is what you'll find today: "a poor imitation of the physical world."

But now it's been a couple of years, and some signs of maturity are appearing. While the vast majority of electronic commerce applications still consist of flat HTML files cobbled together with database access and CGI scripting, said Chris Stevens, electronic commerce analyst at the Aberdeen Group in Boston, a handful of organizations are scrapping (or at least revisiting) their original electronic commerce strategies and are building business-critical systems that open the enterprise to partners, suppliers and customers, 24 hours a day, 7 days a week.

You don't need to lift the hood to recognize one of these new applications. What makes them stand above the crowd is their attitude. A far cry from the confused, fragmented efforts that characterize most early offerings, second-generation applications boldly extend the way a company does business. They are well supported, both politically and technologically. They reflect a knowledge of users' needs and expectations. And they are creative, engaging and easy to use. This, said Ellen Schreiber, director of marketing for electronic commerce at Cambridge Technology Partners, Inc. in Cambridge, Mass., "is where you are going to start to see the bang for the buck."

Is It Worth It?

How many times have you heard the words "electronic commerce" this week? Already the phrase has all but lost its meaning. "It's turning into buzzword marketing," Stevens said. "Everything is moving to networking, so everything is electronic commerce."

But if the moniker is ubiquitous, examples of companies' successful electronic commerce applications are about as common as a Hollywood movie that ends on a downer. Second-generation electronic commerce systems account for less than 5% of the marketplace today, said Stan Lepeak, an analyst at Meta Group, Inc. "In reality," added Bruce Guptill, an analyst at Gartner Group, Inc.,

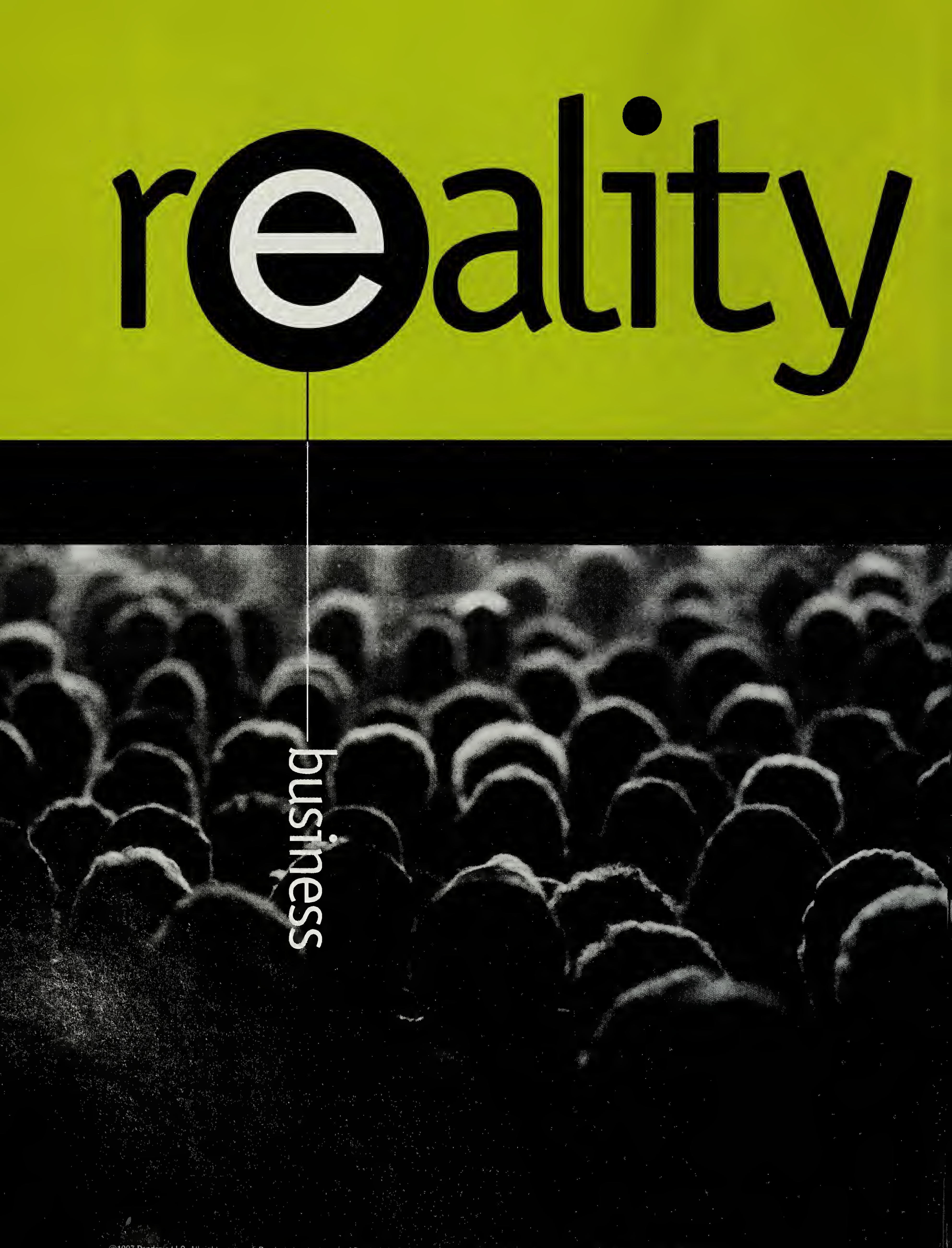
Please turn to page 14

TEN CHARACTERISTICS OF SECOND-GENERATION ELECTRONIC COMMERCE

ALLOWS the business to do something it can't do in the physical world • **OPENS** up back-end systems to new constituents • **MAKES** the Internet a business-critical delivery vehicle • **AGGREGATES** information, creating a new revenue-generating service • **CHAINS** business transactions to one another • **INCLUDES** adaptive navigation, allowing users to switch midstream between parametric or concept-centric searching • **USES** some form of intelligence, such as agents • **ORGANIZES** buyers and sellers; uses registry services or "matchmaking" • **MAKES** interface personalized, dynamic, user-friendly and engaging • **CAN** be cost justified

SOURCES: WALID MOUGAYAR, GARTNER GROUP, INC., FORRESTER RESEARCH, INC., META GROUP, INC.

ILLUSTRATIONS BY DAN PICASSO



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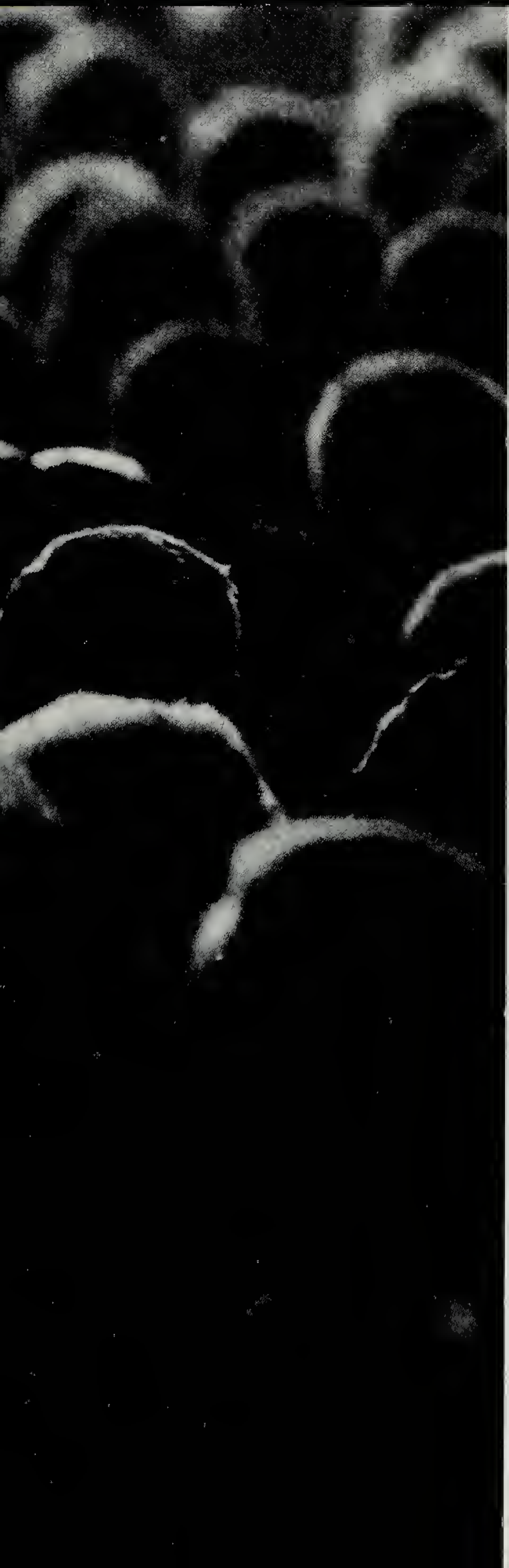

Face it, once someone hits the "Purchase" button on your site, that's when the real work begins. Fortunately, there's the Pandesic™ internet business solution. Marrying the logistics experience of Intel and the business process expertise of SAP, it links everything together—from billing and accounting to inventory and shipping—so anything needed to fulfill an order, happens. The warehouse knows what to move. Billing has numbers. Everyone has realtime reporting. And it's automatic. Visit our site for more. Or call 1-888-349-ebiz, ext. 300. And next time someone visits your site, you'll know exactly what to do: business.

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Continued from page 11

"there are a few select, significant successes with thousands of other firms just beginning to figure out how to do this."

That's partly because of these applications' complexity. Data compatibility, transaction processing, systems integration and scalability issues rival those of large-scale data warehousing. The ongoing maintenance can be staggering. Meanwhile, these highly visible applications expose the enterprise to everything from security problems to embarrassment.

Those issues weigh heavily on Scott Hunt, MIS manager at C&K Components, Inc., a 40-year-old, privately held mechanical switch maker in Watertown, Mass. Hunt is building a Web-based interactive catalog in an effort to attract new customers, decrease print costs and leapfrog competitors.

C&K hopes to distinguish itself with a catalog that reflects individual customer relationships and includes an online "Build-A-Switch" program that lets customers configure millions of different switches and receive technical information and pricing in minutes.

C&K is building the system with LiveCommerce Catalog and OM-Transact from Open Market, Inc. Despite the powerful software, Hunt said, "It's a big project." Already, the company has invested almost $50,000 and 50 to 70 work hours a week for five to six weeks to get fewer than six products online. And it's just in the pilot stage. Its price could reach $150,000 and involve people from not only MIS but also engineering, advertising, marketing and operations. As a result, C&K is proceeding with caution, Hunt said. "We haven't jumped in full-steam."

ELECTRONIC COMMERCE GETS SERIOUS

But it takes a full-steam approach to embark on a project that may well be the most expensive and complicated your company has ever tried. Just look at Genstar Container, a San Francisco-based subsidiary of GE Capital Service Co.

Genstar needed to provide superior service in what had become a commodity business. Recognizing that the answer lay in electronic commerce, the chief executive officer hired Jonathan Fornaci as chief information officer, vice president and chief technology officer and gave him the resources to undertake a $1.5 million project that entailed building a mission-critical extranet that mimicked the life cycle of the business.

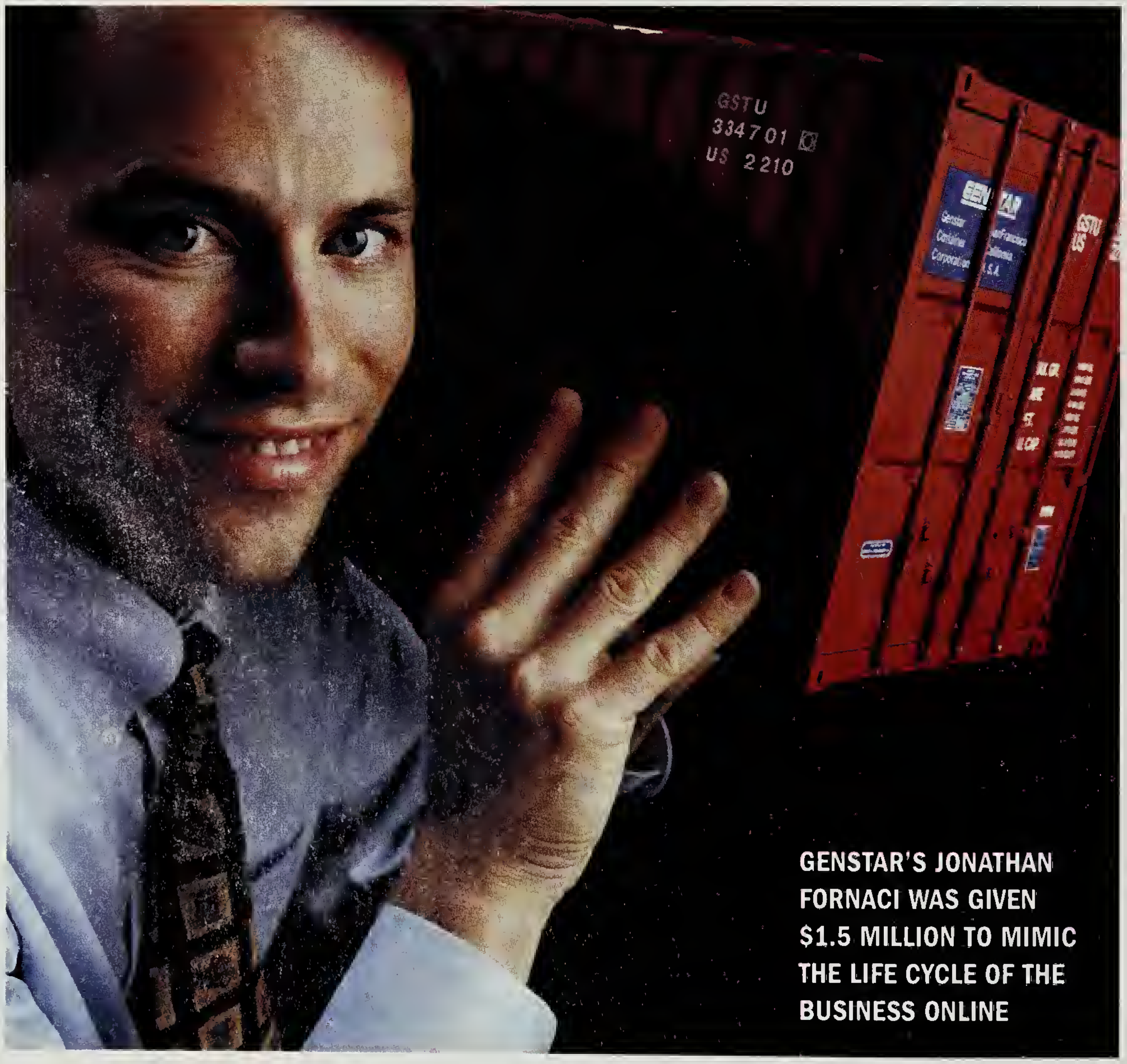
The resulting applications allow customers to do everything from viewing container specifications, maintenance and repair information to ordering containers to downloading billing information in customized formats. Customers can also exchange containers directly rather than having to first return them to Genstar. That feature alone, Fornaci said, saves everyone money.

Most recently, the team created an online inventory and booking system with the help of Cambridge Technology Partners. The Java-based, three-tier client/server system lets customers book equipment in less than three minutes — up to five times faster than booking the containers by telephone.

Here's how it works: If a customer clicks on the icon for that application, the 1M-byte Java program is downloaded to his browser. That can take from two to seven minutes. At that point, say he wants to know how many 20-ft dry vans there are in Hong Kong. He'll see an entry screen with a pull-down menu, from which he selects Hong Kong. Then he selects "20-ft dry vans" from a list of equipment types and clicks to execute a query. The system creates a script that goes out and executes against an Oracle database, returns the results and populates the screen.

Because of the way the application is written, Fornaci said, the only thing returned is the data, so it's a lot faster than if customers had to use HTML over the 'net.

Genstar was so determined to make this system work that Fornaci was given the resources to create a new 15-person department and compensate those staffers differently from the rest of the company. The team, which is putting in 12-hour days six days a week for the duration of the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GENSTAR'S JONATHAN FORNACI WAS GIVEN $1.5 MILLION TO MIMIC THE LIFE CYCLE OF THE BUSINESS ONLINE

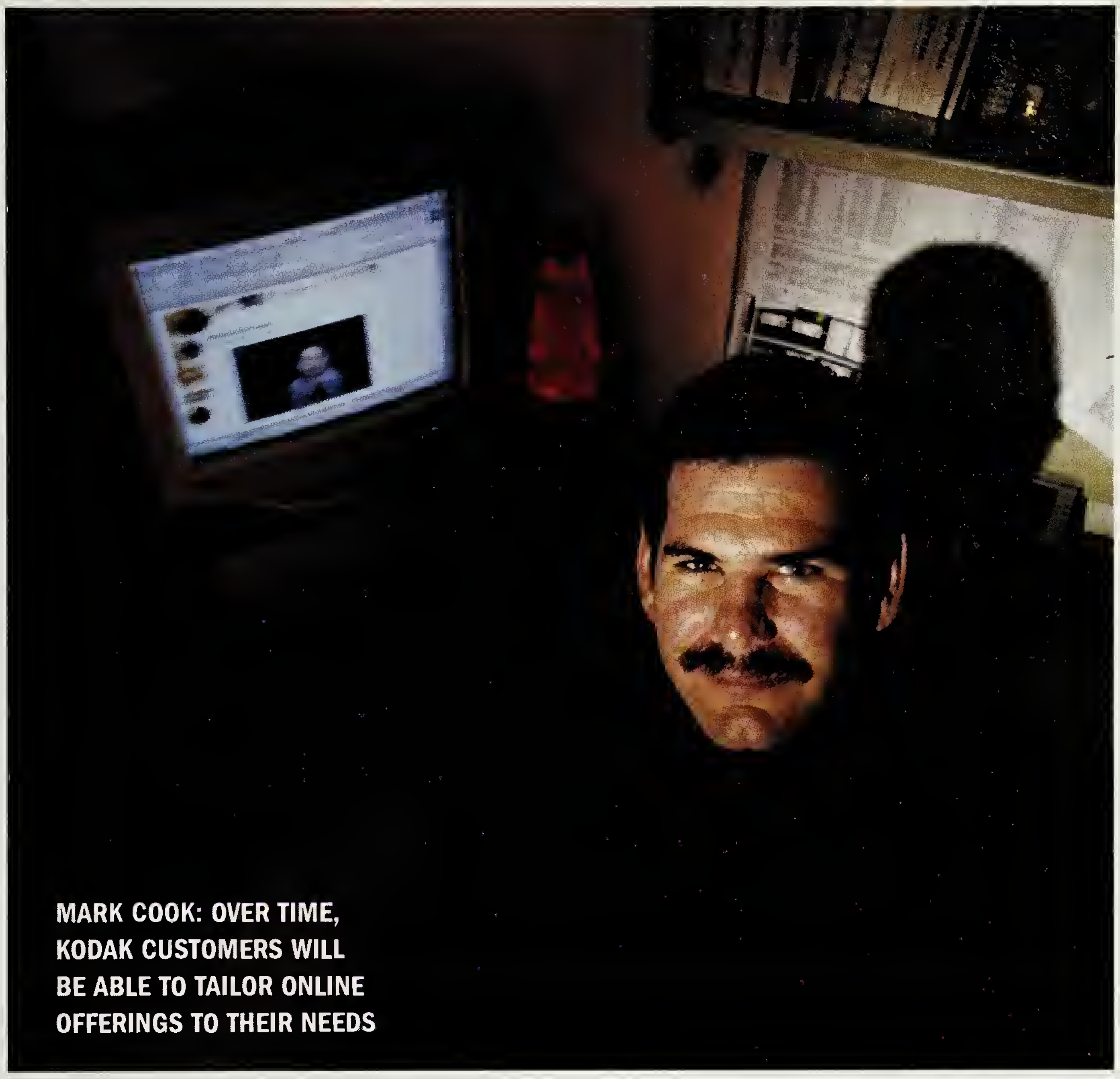
PHOTOGRAPH BY JOHN HARDING

project, has received milestone rewards every couple of months.

So far, the approach seems to work, Fornaci said. At press time, the group had completed 10 of 14 applications and hadn't missed a deadline by more than a day.

And the project itself is already affecting the bottom line. The booking application alone, which cost $500,000, was used to book hundreds of containers in its first day of operation. It was used so extensively, in fact, that it paid for itself in a single day.

The payback for the other applications, while less mind-blowing, was still a respectable six months on average. And that doesn't even include the intangibles, such as turnaround times slashed from seven to 10 days down to 10 to 15 minutes. Overall, the project has been so successful that GE has asked Fornaci to create similar services for other divisions of the company.



MARK COOK: OVER TIME, KODAK CUSTOMERS WILL BE ABLE TO TAILOR ONLINE OFFERINGS TO THEIR NEEDS

THE PERSONAL TOUCH

Eastman Kodak Co., too, is hoping to generate additional revenue by letting customers into its legacy systems. This past August, the Rochester, N.Y., company launched an electronic commerce Web application that allows customers to view and E-mail photos and order reprints online. Built with One-to-One, commerce server software from BroadVision, Inc., the system also enables customer service representatives to look at users' profiles and offer help with their account, similar to credit-card or catalog ordering services.

This brings us to another characteristic of second-generation electronic commerce: personalization. Over time, as Kodak offers products and services that cater to specific market segments (new parents, for example), customers will be able to tailor their experience to their lifestyle needs, said Mark Cook, product manager for the Kodak Picture Network.

Kodak used One-to-One for all but 5% of the code. BroadVision also supplied the commerce engine and helped integrate the system with legacy transaction systems, storage systems and a mainframe-based photo finishing application. Strategic Interactive in Boston handled the site design.

Still, Kodak had to assemble a new team comprised of 60 people and spend a year and a half creating the service. And the project was like no other. "This has forced us to alter our processes," including becoming more flexible and taking "different kinds of risks," Cook said. A recent example included changing a hard-to-read font immediately, rather than fitting it in to the normal release schedule. These kinds of things "make people uncomfortable," he said. "But they work out better for the users in the end."

SHOPPING ON THE WEB

Nowhere is the difference between first- and second-generation electronic commerce more evident than in an online mall. Browsing through a first-generation mall often meant fumbling among often unrelated shops or, as Walid Mougayar, author of "Opening Digital Markets" and president of CyberManagement, Inc. in Toronto, said, searching through "information silos."

Second-generation electronic marketplaces, on the other hand, tightly integrate information about products and services, helping buyers comparison-shop. Milestone Systems, Inc., for example, a venture-backed company in Lexington, Mass., has created a virtual mailroom that allows customers in small to medium-size businesses to compare delivery rates and schedules offered by a host of express delivery companies.

The system uses agent technology from webMethods to repeatedly retrieve tracking data from delivery services' Web sites. Users can submit an airbill number and receive an update as often as they like.

WebMethods' automation tool uses Extensible Markup Language (XML), which allows agents to search multiple Web sites. XML puts more structure and standardization of nomenclature on a

Please turn to next page

PHOTOGRAPH BY FORREST MCMULLIN

Continued from page 15

given Web site's data than HTML. As such, Mougayar said, it will be the "new glue for electronic commerce across disparate Web sites."

This type of "glue" will prove increasingly desirable as buyers, such as the federal government, look for ways to make better purchasing decisions. With the help of a 3-year-old Reston, Va.-based Web site developer, Electric Press, Inc., the government has introduced a procurement system that helps agencies' purchasing departments quickly find out which vendors will, say, sell an HP printer on a particular government schedule, as well as get the prices, warranty periods and a historical schedule of delivery performance.

The system, called eFed, is being rolled out for NASA and the Army and includes a small number of contracts and 30 vendors. Once that rollout is completed, the government will add an agency a month.

The biggest challenge in building eFed, said Duffy Mazan, president of Electric Press, lies in aggregating data from all the vendors and agency inventory, ordering and pricing systems.

Recently, Electric Press began addressing this problem with middleware, or a "virtual database" that provides a common view into a variety of disparate databases. It is made of mainly off-the-shelf components tied together with custom code. The packaged systems include Microsoft Corp.'s Internet Information Server and Netscape Communications Corp.'s Enterprise Server, Informix Corp. and Oracle database JDBC interfaces and an object-oriented database, Object Store from Object Design, Inc. For credit-card processing, it uses Open Market's SecureLink and Transact, with clearing services from First Union Bank.

Today, people at most agencies have to go to 10 or 15 Web sites to compare products and services, Mazan said. But with eFed, they can go to one place for that information. As for the vendors, he added, eFed offers "a way they can get orders without having to do anything."

MATURITY AT A PRICE

So where does all this leave the mainstream electronic commerce strategist? That depends on your industry.

For those in the brokerage industry, where Charles Schwab and Fidelity are setting a standard, it is dangerous to ignore these electronic commerce advances, said Erica Rugullies, industry analyst at Giga Information Group in Cambridge, Mass. It is dangerous likewise in the automotive industry, as well as in any other industry where products can be delivered digitally.

For small companies, it makes much more sense to outsource these complex and expensive applications, Aberdeen's Stevens said. And for those in many manufacturing industries, a wait-and-see approach may make the most sense. "Eventually, everyone will need electronic catalogs," Rugullies said, "but that is down the road."

Not surprisingly, the bottom line is to consider your business case and whether your company is willing to gather the resources and support needed to go the distance. It isn't wise to rush in. At the same time, it's equally foolish to ignore market advances. We may not be fully into second-generation electronic commerce yet, Gartner's Guptill said, but "this is definitely where business is going."

Engler is a freelance writer in Arlington, Mass.

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Second-Generation Applications

The hallmark of a second-generation EC application, analysts say, is that it does something with networks that can't be done effectively any other way. Here are a few examples:

ELECTRONIC MARKETPLACES such as CUC International's NetMarket (www.netmarket.com), Consumer's Edge (www.consumersedge.com) and OnSale (www.onsale.com) aggregate buyers and sellers for transactions and auctions that would be hard to coordinate in the physical world.

FULL LIFE-CYCLE BUSINESS APPS let customers do everything from identifying products to completing purchase orders to tracking delivery status to receiving invoices and reports, all online. Companies offering these services include Marshall Industries (www.marshall.com), Egghead, Genstar Container (www.genstar.com) and MicroAge, Inc. (www.microage.com).

VALUE-ADDED SERVICES. U Vision's ComputerESP (www.computeresp.com), Milestone Systems, Inc. (www.clickandsave.com) and iPrint (www.iprint.com) have used Internet technologies to create new services on top of existing ones. For instance, iPrint lets customers design stationery, invitations and business cards online and have them printed professionally.

PERSONALIZATION CAPABILITIES can be found at the Web sites of Kodak (www.kodak.com) and Life Technologies, Inc. (www.lifetechnologies.com). Life Technologies is upgrading its service so that when a customer logs in, he receives information in his local language.

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[Most **FIRMS** haven't even begun **WEB** disaster planning

When Things Go Wrong...

If you don't think Murphy's Law applies to the Internet ("If anything can go wrong, it will"), you've either been living on Mars or not bothering to read the newspapers lately.

This summer saw the worst of it. In June, Web-related failures shut down stock market trading on the E*Trade Web site for about an hour. A week later, a software glitch in Charles Schwab & Co.'s electronic brokerage service left customers unable to get information about the status of trades or account balances. Then, a combination of computer error and operator carelessness caused Network Solutions, Inc.'s Domain Naming Service (DNS) server to send out corrupted Internet address information.

Because Network Solutions is responsible for managing and assigning Internet addresses worldwide, the mess-up had far-reaching consequences: Some sites remained inaccessible for hours. Worst of all, some Internet service providers (ISP) said at the time, DNS problems of this kind happen regularly, and Network Solutions still has no fail-safe mechanism to stop them.

Such a string of snafus comes as no surprise to Robert Williams, co-founder of The ProShop.com, one of the first Web-only retail sites to go online. "The Web is new; everyone's new" — particularly when it comes to ensuring the 7-by-24 reliability that electronic commerce transactions demand, he explained.

Since ProShop parent company Brainstormers, Inc. first launched the online golf equipment retail site, it has suffered problems with the credit-card transaction server software; with the user access tracking software (see story page 20); and with the Internet service provider itself, which inadvertently took the site off-line during a change of ownership, according to Williams.

ProShop also experienced problems when it first began using Cybercash, Inc.'s secured online credit-card services. "We were having problems with their server software going down, so we had to keep restarting it," Williams said. "They fine-tuned it, changed out a couple of programs, and now it runs flawlessly." A recently released new version of the software fixed some faults for good.

ProShop is definitely in the minority when it comes to developing a cohesive strategy to prevent more from happening, according to Bill Gassman, a senior research analyst at Gartner Group, Inc. "About 20% of companies I'd say are proactive [about Web reliability]; another 30% are talking about it; and the other 50% are trying to figure out what to do about availability issues," Gassman said. Of that 50%, a lot of companies simply assume that "slapping a machine on there and letting it run will work out OK."

That's a mistake, Gassman said, because a downed site or poor response time can mean anything from a marred corporate image to lost business to "a serious and rapid potential loss of the customer base," as when an investment service goes down.

The first thing a company needs to do is analyze the business criticality of its Web site and applications to determine whether a 1% downtime is something it can live with or 7-by-24 uptime is the only way to go, Gassman said.

ONE COMMON KEY

But whatever level of reliability a business Web site needs, everyone agrees that redundancy is the key to fault tolerance. That means "at least two of everything," said David Linthicum, senior manager at Ernst & Young LLP's Center for Technology Enablement. This includes the ISP connection, connectivity technology such as routers and switches and, of course, the Web site itself, including servers, LANs and storage media.

Actual events keep proving how crucial that backup can be, not only in case of failure but also in the event of an unexpected jump in site hits. FedEx Corp., for example, counts itself lucky that when the UPS strike hit, it was in the process of upgrading its Web site links from T1 lines to a T3 connection, said Susan Goeldner, manager of Internet technology for the package handler.

"During the two weeks of the strike, we saw an 85% increase

STRATEGIES. Those that have say **REDUNDANCY** is the key.]

BY ELISABETH HORWITT

in total number of hits," Goeldner said. FedEx handled the volume by speeding up the switchover to the T3 link. "Initially we changed just FTP over, but we were still maxxing out, so we moved everything to the T3 link," with the T1 lines acting as backup.

The Web site provided a crucial means for customers to get updated data on the status of their shipments during the strike because the human call center would have gotten swamped, she said.

Building redundancy into the Web site involves much of the same technology as traditional client/server systems, Linthicum said. "You can set up application rollback, disk mirroring and automatic failover [to a backup system] for the Web servers themselves" using existing operating system tools to ensure synchronization, he said. "The Web won't get in the way."

Even better, vendors are hurrying to Web-enable fault-tolerant products. For example, BEA Systems, Inc. offers Tuxedo Jolt, which is a Web-compliant version of the Tuxedo transaction monitor. Tuxedo monitors server transactions and provides features such as rollback, which allows the system to restart transactions from where they were at the point of failure.

Also, the back ends of many current Web architectures are legacy mainframes and traditional servers that already have fault-tolerant mechanisms in place.

SPECIAL PROBLEMS

However, certain aspects of Web technology, and the Web environment itself, pose special reliability challenges that never troubled the sleep of client/server system administrators.

One challenge has to do with the inner workings of DNS, the protocol by which logical Internet addresses are mapped to actual physical locations.

The problem is that in a secured Web environment, the Internet address mapping protocol will not assign multiple physical addresses to a single Web domain name, said Gideon Sasson, senior vice president of electronic brokerage technology at Schwab. This provides a challenge to companies such as Schwab that are trying to set up fail-over mechanisms that automatically route client queries to a backup server or connection.

In a nonsecure environment, DNS can route client queries for a logical Web address to multiple sites on a round robin basis. But the round robin utility lacks the intelligence, for example, to route queries around a server that has crashed, said Kevin Delgadillo, product manager for Internet technologies at Cisco Systems, Inc.

Schwab's Web site is currently distributed across multiple servers

Please turn to next page

ILLUSTRATION BY MATSU

Continued from page 19

in different parts of the world. The configuration serves two purposes: fault tolerance and scalability through load balancing, Sasson said. To get around the one-to-one DNS mapping limitation, the San Francisco-based investment firm developed a homegrown utility that "enables customers to click on a link that uses an algorithm to dynamically pick one of many servers," he added. All it takes is one click of the mouse; nevertheless, Schwab still needs to persuade customers to use that URL rather than a bookmark linked to one server, Sasson said.

Schwab is also looking at two Cisco products said to address its DNS addressing needs: Local Director and Distributed Director. Both products are said to send incoming DNS queries to one logical Web address and route them across multiple physical servers on an intelligent basis. For example, a Director server can route queries to the server with the lightest traffic load or reroute queries around a downed server.

Local Director works with multiple local server clusters. Distributed Director, shipping since March, provides intelligent multisite addressing on the actual Internet WAN. IBM's Network Dispatcher is said to provide comparable capabilities.

But one issue for Schwab is that an intermediate server such as Local Director "in itself becomes a single point of failure," Sasson said. There still needs to be that single physical address that Internet DNS directory servers can recognize and map to.

And while one Local Director server can support multiple server clusters, a small firm with a small Web site operation may find it hard to justify the $32,000 price tag. Distributed Director costs $17,000 to $35,000.

Schwab's site has experienced failures: once when BBN, its ISP, had a system crash and again when a glitch developed in its internally developed Web middleware, Sasson said. The company hopes to finish eliminating single points of failure by year's end, when a backup data center in San Francisco gains Web capabilities, he said. Then the San Francisco center and the primary center in Phoenix "will be able to manage the whole data load of our entire business at any given time," and when one goes down, the other can take over, he said.

THE STATELESS PROBLEM

The Web's stateless nature can also pose reliability challenges — specifically, when it comes to preserving user transactions if and when a site does go down.

ProShop, for example, is looking at two ways to ensure rollback procedures with the customer database, Williams said. One way is to "cookie the shopping cart," he said — i.e., make a record of a customer's transactions and store it as a cookie on the customer's system, with a unique ID. If something interrupts the transaction, the information would be accessible to the Web server the next time the customer logged on.

But a new cookie specification that the Internet Engineering Task Force is now debating threatens to make many Web clients cookie-proof (see related feature story at www.computerworld.com/emmerce). Fortunately, ProShop uses Webspeed Transaction Server, a Web application development environment in which multiple agents handle Web client/server transactions. Besides enabling the site to process multiple transactions simultaneously, the agents can also lock on to a customer's browser and "keep a transaction open for hours, days, months" when the server fails or the connection is disrupted, Williams said.

Another difficulty in controlling reliability on the Web stems from the need to entrust at least some pieces of one's Web architecture to others: ISPs, carriers and the routers of the Internet itself.

There is not a lot users can do, for example, to guard against a DNS server crash that makes some addresses unreachable — except lobby Network Solutions to build more fault tolerance into its systems.

In other areas, however, users have at least

Troubleshooting @ ProShop.com

So you thought pinpointing trouble spots on client/server installations was tough? ProShop.com owner Brainstormers, Inc. learned the hard way that the Web can add a whole extra level of difficulty to the task of troubleshooting.

Three months after the golf equipment retailing site went online, it began going down intermittently on weekends – its busiest time, founder Will Pringle said. "Basically, it meant we were closed for business" because there is no physical store front, mail-order catalog or call-in center to provide a backup channel.

ProShop's techies first checked for disk errors and problems on the Windows NT server. They then upgraded the RAM, but the site still went down.

PROSHOP'S WILL PRINGLE PINPOINTED WHY SITE WAS DOWN ON WEEKENDS

But checking the RAM uncovered the problem: the software that parsed the weekly user access log file over the weekend. The parser ensures that only certain user access log activities get recorded "so we don't end up entering every detail," Pringle said. As the site grew popular and hits became more frequent, the parser demanded more RAM until the server had to discontinue other key processes, then shut down.

"We solved the problem by changing our system to parse the files daily, and we never had the problem again," Pringle said.

– ELISABETH HORWITT

PHOTOGRAPH BY MICHAEL I. PRICE

some recourse. After its first ISP inadvertently took The ProShop.com off-line, for example, Brainstormers took matters into its own hands. First, it moved the site, which the ISP had been maintaining, in-house. "That way, we can control server reliability" by installing redundant servers and hard drives, Williams said.

Secondly, the golf equipment site switched its Internet links to another provider: a large, well-known company. So far, there have been no problems.

Going with a larger provider makes sense, Linthicum said, "because global-class companies like BBN Planet, Worldnet, MCI and UUNet have the money and resources to create huge networks with no single point of failure." And a growing number of major ISPs, including IBM Global Network and Aegis, provide disaster recovery services that include maintaining a backup Web site, monitoring the primary site for failures and rerouting Web queries to the backup site when failure does occur (see story at right).

Not that the big shops are proof against service interruptions, as several recent incidents attest. They are just less vulnerable than the small shops.

To be safe, Ernst & Young has dual connections to two different ISPs, Linthicum said. "ISPs may be down 1% of the time, but that may represent [the loss of] a million dollars for an organization." Indeed, Linthicum cited the real example of an unnamed financial company that lost a million dollars in business when its Web site went down for 24 hours. The cause: a severed telephone line to its ISP.

The bottom line is, "Guaranteed service levels can only be as good as all of the links that make up the connection," Sasson said. "And nobody controls all of those links."

Horwitt is a freelance writer in Waban, Mass.

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When Disaster Strikes

For Reality Online, Inc., the decision to set up a separate disaster recovery backup site was pretty much a no-brainer. A Norristown, Pa.-based subsidiary of Reuters America, Inc., Reality Online provides online brokerage services and information on the Web. When the company conducted an in-house study of the business impact of site downtime, it concluded it could not afford to go off-line for even a day.

"We looked at a number of different ways to do it, including a separate data center, a fully mirrored [or hot] site and building our own," said Jeff Jones, senior vice president of Reuters' Web Development and Operations Group. The final choice was a dedicated facility at Sungard Recovery Services, Inc.'s Philadelphia MegaCenter.

Both backup and primary sites are linked via a T3 line to Reality Online's primary ISP, UUNet. Should the primary site go down, the backup site can take over within an hour, Jones said. Primary site backup tapes are delivered to the Sungard facility every night, so it could be as much as 24 hours out of date when a disaster hits. "This is not currently a problem with us," Jones said.

Sungard created the Web disaster recovery service for Reuters but has since commercialized the offering. Sungard perceives the market as very young but growing rapidly, said Doug Clauson, a spokesman for the disaster recovery unit of SunGard Data Systems. Right now, users and vendors alike are "still figuring out what products and services are needed and what exactly disaster recovery is in the Web environment," he explained.

And a spate of vendors are introducing Web site disaster recovery services. Here are some of the major players:

- DISASTER RECOVERY services such as Sungard and rival Comdisco, Inc. Sungard's offering costs in the neighborhood of $2,000 a month, Clauson said.
- WEB HOSTING and site management services are offering customers the ability to set up redundant Web sites on geographically distributed facilities, with the ability to automatically reroute traffic to the backup site if the primary one goes down.

GTE Corp. subsidiary BBN Corp. and Exodus Communications, Inc. in Santa Clara, Calif., for example, are both in the process of implementing Cisco's Distributed Director to provide this capability, company spokesmen said (see story page 18).

- LEADING ISPs and carriers will monitor customer sites and automatically reroute traffic to a backup site in case of failure.
- IN MARCH 1996, IBM Business Recovery Services and Internet service provider Icon CMT Corp. jointly introduced Internet recovery services.

In addition to helping customers design and implement their own Web site disaster recovery, the service will host duplicate sites at its own facilities, according to Mike Solter, project manager at the IBM subsidiary. In addition, IBM Network Services now offers IP address relocation that automatically reroutes IP traffic from a primary Web site to the backup site at an IBM Recovery Services center, Solter said.

The price of such services depends on how quickly a customer needs to have the backup site take over and how fresh the data needs to be, Solter said. If a customer can tolerate, say, a 24-hour recovery range and is willing to share facilities with other customers, a backup facility costs 10% to 15% of the cost of running the whole application, he said.

Indeed, one of the main lures of Web disaster recovery services is that they cost significantly less than a comparable in-house facility. Reality Online believes it realized cost savings of 40% to 45% by going with Sungard's recovery service instead of building its own disaster recovery facility, Jones said.

Off THE Books

COMPILED BY CARLA CATALANO

HOW **MUCH** HAVE **YOU** CHANGED?

We asked EC practitioners what the biggest change to their EC strategy has been in the past year

Frank Trotter

Managing Director,
Capital Markets Group
Mercantile Bank (former Mark Twain Bank), *St. Louis*
www.mercantile.com

"FROM A payment standpoint, we have begun to focus on businesses . . . within our ecash project. Ecash has been running for two years, but for the first 18 to 20 months, the focus was on retail. Now the focus is on corporate payments, primarily incorporating our payment system into legacy and new Internet-compatible accounting systems. This way, corporations can make automatic real-time payments using ecash."

Steve Whan

Computer Specialist
B.C. Hydro
British Columbia
www.bchydro.bc.ca

"ONE YEAR ago, we had a static Web site. Now we're getting consumers to visit our Web site by providing more customer-service-oriented functions, such as electronic bills, usage history, environmental information, graphical links and our Power Smart program, which is designed to make consumers more energy conscious. Six months from now, we hope to take electronic payment from our customers."

Mark Hatch

Director of Marketing,
Business Development
Avery Dennison Office Products
Diamond Bar, Calif.
www.avery.com

"OUR biggest change is the shift in senior management mentality. Management now understands that our Web site is not the most important part of our strategy but that the linkages to our trade partners and their e-commerce strategies are. These strategies are in the early stages of maturing. We get more requests and demands from our trade partners for linkages, content and integration issues than we did a year ago."

Laura Longcore

Marketing Systems Manager
Boise Cascade Office Products
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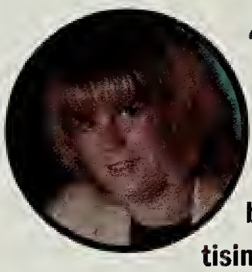

"OUR biggest change is less billboard advertising and more focus on true commerce. Our primary focus now is extending true electronic transactions to our customers, such as sending electronic catalogs, providing customizable ordering tools and also providing inventory and order-tracking information. Previously, our main commerce provision was our static Web page, which provided our location, phone and address."

'Net SURVIVORS

Find out whether your potential partner passes the Seven M's test

By Tom Austin

Choosing a business partner, especially in an evolving technology such as the Web, is risky. There's no assurance that the company you choose will even survive the next few years. I've met with and evaluated dozens of potential partners for my clients, and only one thing is for sure: There's no sure bet.

As our choices increase, so do the risks. No one wants to spend money with companies that aren't going to make it. Remember WAIS? See what you'll find at www.wais.com.

So how can you minimize risk? Consider applying the "Seven M's screen test" in your evaluation. Look for the following:

MONEY — or the wherewithal to persevere and pass their competitors. Cash is king. MISSION — of the company, its core strategy, its true conviction. MIND SHARE — of both the company's employees and its economic buyers, the faith. MARKET SHARE — in a closely related area that provides it with leverage to succeed worldwide. MOMENTUM — having the right technology at the right time with the right marketing. MELDING — technology attribute that enables the product set to work seamlessly with others. MEANING — the ability to make a significant impact on you and your business.

For example, Rotherwick Firewall Resource (www.zeuros.co.uk/firewall) lists 63 firewall companies with products. Which would you choose? Many lack momentum and the ability to meld. Based on the Seven M's, my list includes Checkpoint, Cisco, IBM and Trusted Information Systems. The same can be said for digital certificate vendors. Which one's a good bet? My list includes GTE and VeriSign. How about yours?

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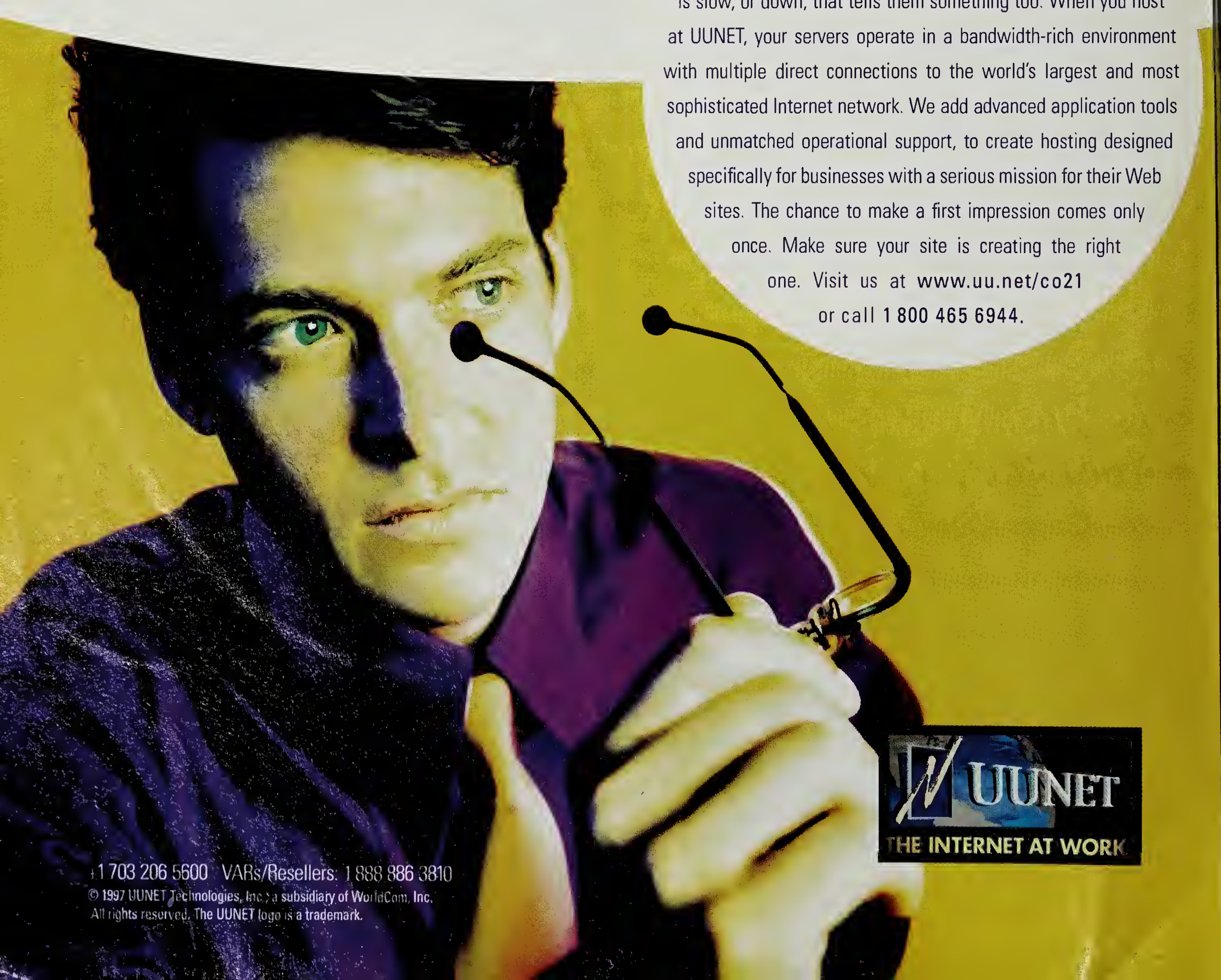

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